

REMARKS¹

In the outstanding Office Action, the Examiner rejected claims 13-23 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,642,130 to Park ("Park") in view of U.S. Patent No. 6,534,352 to Kim ("Kim"); and rejected claim 13 under 35 U.S.C. § 103(a) as being unpatentable over Park in view of Kim, and further in view of U.S. Patent No. 6,309,933 to Li et al. ("Li").

By this amendment, Applicant has amended claim 13. Claims 13-23 remain pending in this application.

Applicant respectfully traverses the Examiner's rejection of claims 13-23 under 35 U.S.C. § 103(a). A *prima facie* case of obviousness cannot be established.

To establish a *prima facie* case of obviousness under 35 U.S.C. § 103(a), each of three requirements must be met. First, the reference or references, taken alone or combined, must teach or suggest each and every element recited in the claims. Second, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to combine the references in a manner resulting in the claimed invention. Third, a reasonable expectation of success must exist. Moreover, each of the three requirements must "be found in the prior art, and not be based on applicant's disclosure." See MPEP § 2143, 8th Ed. (Rev. 5), August, 2006.

¹ The Office Action contains a number of statements reflecting characterizations of the related art and the claims. Regardless of whether any such statement is identified herein, Applicants decline to automatically subscribe to any statement of characterization in the Office Action.

A *prima facie* case of obviousness of claims 13-23 cannot be established for at least the reason that the references, whether taken alone or in combination, fail to teach or suggest every element recited in claims 13-23.

Regarding the rejection of claims 13-23 under 35 U.S.C. § 103(a) as being unpatentable over only Park and Kim, Applicants submit that a Park and Kim, whether taken alone or in combination, fail to teach or suggest a combination including “forming source/drain regions by performing an ion implantation on the substrate using the spacers and the trench gate as a mask,” as recited in claim 13. The Examiner acknowledges this deficiency of Park and Kim, expressly stating “Park in view of Kim fails to show using the spacers and the trench gate as a mask to form the source/drain regions.” Office Action, page 5. Moreover, the Examiner provides no additional motivation or suggestion of how to modify Park or Kim to cure this deficiency. Accordingly, Park and Kim fail to teach or suggest a combination including “forming source/drain regions by performing an ion implantation on the substrate using the spacers and the trench gate as a mask,” as recited in claim 13.

For at least the reason that Park and Kim, whether taken alone or in combination, fail to teach or suggest every element recited in claim 13, a *prima facie* case of obviousness has not been established. Accordingly, Applicant respectfully requests that the Examiner withdraw the rejection of claim 13 under 35 U.S.C. § 103(a) as being unpatentable over Park and Kim.

Claims 14-23 depend from claim 13, and thus require all of the elements recited in claim 13. Because Park and Kim fail to teach or suggest every element recited in claim 13, that combination of references also fails to teach or suggest every element

required by claims 14-23. Accordingly, a *prima facie* case of obviousness has not been established with respect to claims 14-23. Applicant therefore respectfully requests that the Examiner withdraw the rejection of claims 14-23 under 35 U.S.C. § 103(a) as being unpatentable over Park and Kim.

Regarding the rejection of claim 13 under 35 U.S.C. § 103(a) as being unpatentable over Park and Kim, and further in view of Li, Applicant submits that a *prima facie* case of obviousness cannot be established because Park, Kim, and Li, whether taken alone or in combination, fail to teach or suggest a combination including “anisotropically etching the first insulating layer, except for a portion of the first insulating layer positioned on sidewalls of the trench gate, to form spacers,” as recited in claim 13.

The Examiner asserts that Park teaches this element, stating that “Park discloses ... etching the first insulating layer to form spacers 18 (figure 5; col. 3, lines 37-43).” Office Action, pages 2-3. To the extent that second pad oxide layer 18 of Park be construed as reasonably corresponding to Applicant’s claimed “spacers,” Park teaches “second pad oxide layer 18 formed on the bottom of the trench C is removed by an anisotropic dry etching” (col. 3, lines 38-40), and “[t]hen ... gate forming materials are deposited on the entire surface of the resultant structure to fill the inside of the trench” (col. 3, lines 60-62). That is, Park teaches etching second pad oxide layer 18, and then forming the gate. Park thus cannot teach or suggest etching second pad oxide layer 18 except for a portion on sidewalls of the trench gate because a gate is not yet formed at the time of etching. Accordingly, Park fails to teach or suggest a combination including “anisotropically etching the first insulating layer, except for a

portion of the first insulating layer positioned on sidewalls of the trench gate, to form spacers,” as recited in claim 13.

Kim fails to cure the above-noted deficiencies of Park. Kim teaches “[a] nitride film is deposited to the thickness of 900 to 1200 Å on the entire resultant structure and then blanket etched to form spacers 33 on the side walls of the hard mask pattern 26a and the sacrificial gate 25a.” Kim, col. 4, lines 41-45 (emphasis added). Kim further teaches “a metal gate 40 is then formed by polishing metal film gate 37.” Id., at col. 5, lines 17-18. Kim thus teaches forming spacers on sidewalls of hard mask pattern 26a and sacrificial gate 25a, and then forming metal gate 40. Similar to Park, Kim teaches forming spacers 33 before forming a trench gate, such as metal gate 40. Accordingly, Kim fails to teach or suggest a combination including “anisotropically etching the first insulating layer, except for a portion of the first insulating layer positioned on sidewalls of the trench gate, to form spacers,” as recited in claim 13, and cannot cure the deficiencies of Park.

Li fails to cure the deficiencies of Park and Kim. Li teaches “patterned photoresist layer 54 is stripped and removed leaving SiN sidewall spacers 70 underneath overhangs 66.” Li, col. 5, lines 58-60 (emphasis added). Li, however, does not teach that sidewall spacers 70 are formed by “anisotropically etching the first insulating layer,” as recited in claim 13. Rather, Li teaches that sidewall spacers 70 are formed from stripping photoresist layer 54. Moreover, Li teaches that sidewall spacers 70 are formed on the sidewalls of, and underneath, overhangs 66, and not “positioned on sidewalls of the trench gate,” as recited in claim 13. Accordingly, Li fails to teach or suggest a combination including “anisotropically etching the first insulating layer, except

for a portion of the first insulating layer positioned on sidewalls of the trench gate, to form spacers," as recited in claim 13, and cannot cure the deficiencies of Park and Kim.

For at least the reason that the references, whether taken alone or in combination, fail to teach or suggest every element recited in claim 13, a *prima facie* case of obviousness cannot be established. Accordingly, Applicant respectfully requests that the Examiner withdraw the rejection of claim 13 under 35 U.S.C. § 103(a) as being unpatentable over Park and Kim in view of Li.


In view of the foregoing amendments and remarks, Applicant respectfully requests reconsideration and reexamination of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

FINNEGAN, HENDERSON, FARABOW,
GARRETT & DUNNER, L.L.P.

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By: 
Darrell D. Kinder, Jr.
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